REMARKS

Applicants gratefully acknowledge the Examiner's Interview conducted on July 12, 2005 with Examiner Phan, SPE Cuneo, and Applicants' representatives, Mr. Ashton and Mr. Szipl. (See Examiner's Interview Summary, dated July 12, 2005).

Additionally, Applicants submit herewith a certified English translation of the Priority Document, Swiss Patent Application No. 0367/01, filed February 28, 2001. Applicants have previously claimed priority to the Swiss Patent Application No. 0367/01 and filed a certified copy of this document, which has been acknowledged by the Examiner (See Office Action dated December 17, 2003, Office Action Summary, Section 13). In view of the present submission, Applicants have perfected their priority claim based on Swiss Patent Application No. 0367/01. Therefore, the priority date for the present application has been established as February 28, 2001.

The drawings have been amended to add new Figure 2, which shows the conductive path on substrate (6), wherein the conductive path includes conductive layer (20), protective layer (30), and underlayer (40) as supported on page 2, lines 18-36, of the original specification as acknowledged by the Examiner (See Examiner Interview Summary, dated July 12, 2005, at 3). The specification has been amended to provide a brief description of Figure 2 and to add the character references "20," "30" and "40" shown in Figure 2. In view of the present amendment, the Examiner's previous objection to the drawings has been obviated.

Claims 2, 3, 9, 24 and 25 have been canceled without prejudice. Claims 1, 5, 6, 8, 11, 13, 15 and 23 have been amended, and new claims 26 and 27 have been added. Specifically, independent claim 1 has been amended to incorporate the subject matter

of claims 2, 3, 24 and 25. Independent claim 23 has been amended to incorporate the subject matter of dependent claims 24 and 25.

Claim 5 has been amended to depend upon claim 1, which has no limiting effect on the scope of this claim. Claim 6 has been amended to depend upon claim 23. Claim 8 has been amended to depend upon claim 23. Claim 11 has been amended to depend upon claim 7, which has no limiting effect on the scope of this claim. Claim 15 has been amended to depend upon claim 22, which has no limiting effect on the scope of this claim.

New claim 26 depends upon claim 23, and further recites "wherein the conductive paths disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as supported on page 3, lines 9-25, of the specification as originally filed. New claim 27 depends upon claim 12, and further recites "wherein the conductive paths disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as supported on page 3, lines 9-25, of the specification as originally filed.

The present amendment adds no new matter to the instant application.

The Invention

The present invention pertains broadly to a timepiece, such as would have a microgenerator for powering various electronic and/or mechanical components of the timepiece. A first embodiment in accordance with the present invention is a timepiece having the features recited in claim 1. A second embodiment in accordance with the present invention is a timepiece having the features recited in claim 23. Various other

embodiments in accordance with the present invention are recited in the dependent claims.

All of the embodiments, in accordance with the present invention, relate to a timepiece having "an electronic module including a support with conductive paths" wherein certain conductive paths are "made of essentially non-magnetic material." The phrase "non-magnetic material" has a specific definition as provided on page 1, lines 8-10, of the present application. Because the conductive paths are "made of essentially non-magnetic material," they do not generate an opposing magnetic field when in proximity to an operating functional unit including magnetized masses. Consequently, the conducting paths of the timepiece, in accordance with the present invention, do not act to brake the operation of the functional unit.

The Rejections

Claims 1-3, 5-17 and 20-25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Schafroth (U.S. Patent 6,124,649) in view of Applicants' Admitted Prior Art (Applicants' specification, at 2) and Lin (U.S. Patent 4,176,362).

Applicants respectfully traverse the rejection and request reconsideration of the application for the following reasons.

Applicants' Arguments

A patentability analysis under 35 U.S.C. § 103 requires (a) determining the scope and content of the prior art, (b) ascertaining the differences between the prior art and the claimed subject matter, (c) resolving the level of ordinary skill in the pertinent art, and (d)

considering secondary considerations that may serve as indicia of nonobviousness or obviousness. Graham v. John Deere Co. of Kansas City, 148 U.S.P.Q. 459, 467 (1966). Furthermore, a proper rejection under Section 103 further requires showing (1) that the prior art would have suggested to a person of ordinary skill in the art that they should make the claimed device or carry out the claimed process, (2) that the prior art would have revealed to a person of ordinary skill in the art that in so making or doing, there would have been a reasonable expectation of success, and (3) both the suggestion and the reasonable expectation of success must be found in the prior art and not in the applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991).

The Schafroth Patent

U.S. Patent 6,124,649 to Schafroth (hereafter, the Schafroth Patent) teaches a "micro-generator module and clockwork movement containing such a micro-generator" as shown in Figures 1 and 2. The Schafroth Patent teaches that the micro-generator includes a shaft (10) connected to a rotor, wherein the rotor includes an upper disk (11) and a lower disk (13). The disks (11) and (13) are made of sheet metal with high saturation (i.e., remanence about 2.4 Tesla), (col. 2, lines 58-62). Each disk (11) and (13) has six individual magnets glued thereon and disposed with north-south-north alternating polarity. A spring (not shown) drives seconds-wheel (71) mounted on seconds-arbor (70), and the seconds-wheel (71) drives first intermediate pinion (60) which, in turn, drives second intermediate pinion (50), (col. 2, lines 26-50). The second intermediate pinion (50) and its arbor are made of non-magnetic material such as copper-beryllium alloy (col. 2, lines 41-45).

The Schafroth Patent further teaches an electronic module (80) equipped with a micro-generator as shown in Figure 2, wherein the module includes three coils (20), (21) and (22) mounted between disks (11) and (13) and disposed so there is a space (18) between coils (20) and (21). This asymmetric arrangement of coils (20), (21) and (22) with respect to shaft (10) of the rotor makes it possible to mount the rotor after coils (20), (21) and (22) have been glued to the module (80), (col. 4, lines 54-63). An integrated circuit (81) is mounted on module (80) and is connected to monitor the rotational speed of the micro-generator and to adjust this speed by changing the value of a variable load resistor (col. 3, lines 60-64). The circuit includes a voltage tripler that uses three capacitors (82), (83) and (84), which are mounted to the module (80) outside of the integrated circuit (81).

The Schafroth Patent teaches that coils (20) and (22) are soldered or glued to the module (80) at point of connection (801), coils (21) and (22) are soldered or bonded to the module (80) at point of connection (802), coil (20) is soldered or bonded to point of connection (800), and coil (21) is soldered or bonded to point of connection (803). Thus, the Schafroth Patent teaches that the coils (20), (21) and (22) are connected in series between the points (800), (801), (802) and (803) so voltages produced by the coils are added (col. 3, lines 49-60). As shown by Figure 2, points (800), (801), (802) and (803) are connected by conducting paths on the printed circuit, which were made using conventional print circuit technology (col. 3, lines 54-60).

As admitted by the Examiner (Office Action, dated March 25, 2005, at 3, line 24, to at 25, line 2; and Office Action, dated May 11, 2004, at 3, line 23, to at 4, line 2), the Schafroth Patent fails to teach, or even suggest, that the "conductive paths...made

of essentially non-magnetic material" as recited in claims 1 and 23, that the "conductive paths include a protective layer formed of a non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claim 1; that "said conductive paths include an adherence underlayer formed of a non-magnetic material" as recited in claims 7 and 8; and that the "adherence underlayer is made of a nickel based alloy" as recited in claims 10 and 11 of the present application. Furthermore, the Schafroth Patent does not teach, or event suggest, that the "non-magnetic material is selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claims 23 and 27; and that the "conductive paths disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as recited in claims 26 and 27.

Applicants' Admitted Prior Art

Applicants' specification, on page 2, line 29, to page 3, line 4, teaches that electrically conductive paths are typically made in two steps. First, a layer of very good conductive material, such as copper or gold based alloy, is deposited on the substrate (Applicants' specification, at 2, lines 30-31). Copper and gold are non-magnetic metals (Applicants' specification, at 3, lines 9-10). In a second step, a fine protective layer of a nickel based alloy, which has good resistance to oxidisation and has ferromagnetic properties, is deposited on the conductive layer (Applicants' specification, at 2, lines 31-33, and at 3, lines 3-4). Sometimes, an underlayer is deposited before depositing the conductive layer to improve adherence of the

conductive layer to the substrate, and the underlayer is made of a nickel based alloy (Applicants' specification, at 2, lines 33-36).

Applicants' Admitted Prior Art fails to teach, or even suggest, that "at least those conductive paths located in proximity to said functional unit are made of essentially non-magnetic material" as recited in claim 1; "a protective layer formed of a non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claim 1; an "underlayer formed of a non-magnetic material" as recited in claims 7 and 8; a "non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claims 1 and 23; and "wherein the conductive paths disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as recited in claims 26 and 27.

The Lin Patent

U.S. Patent 6,562,709 B1 to Lin (hereafter, the Lin Patent) teaches a "semiconductor chip assembly with simultaneously electroplated contact terminal and connection joint," such as shown in Figure 1G, which is made using the method illustrated by Figures 3A to 3G. However, the Lin Patent also teaches that conductive trace, contact terminal and connection joint can be various conductive materials including copper, gold, nickel, palladium, tin, and combinations thereof, and alloys thereof (col. 11, lines 46-57). The Lin Patent also teaches that it is generally desirable to protect electroplated copper with another electroplated metal such as nickel, palladium or gold (col. 11, lines 57-59). However, the Lin Patent is silent regarding the

ferromagnetic properties of the metals nickel, palladium and gold employed to protect the electroplated copper.

Consequently, the Lin Patent does not teach, or even suggest, a "timepiece ...wherein at least those conductive paths located in proximity to said functional unit are made of essentially non-magnetic material, wherein the conductive paths include a protective layer formed of a non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claim 1 of the present application. Furthermore, the Lin Patent does not teach, or suggest, an "adherence underlayer is made of a nickel based alloy" as recited in claims 10 and 11.

The Lin Patent also does not teach, or even suggest, that (i) "the conductive paths are made of essentially non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" and (ii) "wherein conductive paths disposed in proximity to the microgenerator do not disturb operation of the microgenerator" as recited in claim 23. The Lin Patent also does not teach, or even suggest, that "the conductive paths disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as recited in claims 26 and 27.

Summary of the Art

The Schafroth Patent teaches a clockwork movement containing a micro-generator connected by conducting paths to various points and to an integrated circuit on a printed circuit.

The Applicants' Admitted Prior Art teaches that a conductive path may include three layers on a substrate as follows: (1) an underlayer made of nickel based alloy deposited on the substrate, (2) a conductive layer made of a conductive material such as copper or gold based alloy, and (3) a protective layer made of ferromagnetic nickel based alloy. Applicants' Admitted Prior Art also teaches that gold and copper are non-magnetic metals.

The Lin Patent teaches that a conductive trace can be various conductive materials including copper, gold, nickel, palladium, tin, and combinations thereof, and alloys thereof. The Lin Patent additionally teaches that when the conductive material is electroplated copper, then a protective layer of electroplated metal, such as nickel, palladium or gold, is desirable. However, the Lin Patent is silent regarding the ferromagnetic or magnetic properties of nickel, palladium or gold.

As is plain from the scope and content of the Art relied upon by the Examiner, neither the Schafroth Patent, Applicants' Admitted Prior Art, nor the Lin Patent teach, or even suggest, (i) a protective layer formed of a non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy as recited in claim 1, and (ii) an adherence underlayer formed of a non-magnetic nickel based alloy as recited in claims 10 and 11.

As conceded by the Examiner (See Examiner's Interview Summary of July 12, 2005, at 3), neither the Schafroth Patent, the Applicants' Admitted Prior Art, nor the Lin Patent teach, or even suggest, (iv) "conductive paths...made of essentially non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy, and wherein conductive paths disposed in

proximity to the microgenerator do not disturb operation of the microgenerator" as recited in claim 23, and (v) "the conductive paths include a protective layer formed of a non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claim 1 of the present application.

Furthermore, neither the Schafroth Patent, Applicants' Admitted Prior Art, nor the Lin Patent teach, or even suggest, "the conductive paths disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as recited in claims 26 and 27.

Conclusion

The rejection of claims 1, 5-8, 10-17 and 20-23 under 35 U.S.C. § 103(a) is untenable and must be withdrawn because the scope and content provided by the Schafroth Patent, Applicant's Admitted Prior Art, and the Lin Patent, is insufficient to support the Examiner's obviousness rejection. Specifically, none of these reference teach, or even suggest, (i) conductive paths that include "a protective layer formed of a non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and an palladium based alloy" as recited in independent claim 1; an adherence underlayer made of non-magnetic nickel based alloy as recited in claims 10 and 11; conductive paths "made of essentially non-magnetic material selected from the group consisting of a nickel based alloy containing phosphorous and a palladium based alloy" as recited in claim 23; and "wherein the conductive paths

disposed in proximity to the microgenerator are non-magnetic and do not brake the microgenerator" as recited in claims 26 and 27.

For all of the above reasons, claims 1, 5-8, 10-17, 20-23, 26 and 27 are in condition for allowance, and a prompt notice of allowance is earnestly solicited. Questions are welcomed by the below signed attorney of record for the Applicants.

Respectfully submitted,

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Amendments to the Drawings:

The attached sheet of drawings includes new Fig. 2. This sheet, which includes only Fig. 2, is fully supported on page 2, lines 18-36, of the specification as originally filed.

Attachment: One Replacement Sheet